Dyna-Form® Mercury Advance

User Manual

Direct Healthcare™
Services
Delivering the Promise

Dyna-Form®
Mercury Advance

The **Dyna-Form® Mercury Advance** is a pressure relieving mattress suitable for use with patients at **VERY HIGH RISK** of pressure ulcer damage.

Offering high levels of patient comfort, this unique system has the facility to "step up" to that of a dynamic mattress when clinically required. Similarly, the mattress's function can be downgraded as the patient's condition improves.

These features make it particularly beneficial for use within the patient's home or palliative care environment and help reduce logistic and decontamination costs. The clinical benefits of a single system are equally applicable to those of a modern hospital setting. A higher maximum weight capacity, up to *40 stone / 254kg, allows the product to meet the modern challenges of those heavier clients. All component parts are interchangeable and replaceable, maximising product life and reducing environmental impact.

*Denotes when in Static Mode

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1. Introduction

The Mattress consists of a foam head cell and series of 14 transverse air cells, each containing a unique foam profiled insert, which are in turn held within a foam U Core, all protected by a vapour permeable waterproof cover. The single head end cell and the formers consist of foam only. The transverse cells are arranged into alternate pairs of A and B cells which are filled and emptied in sequence.

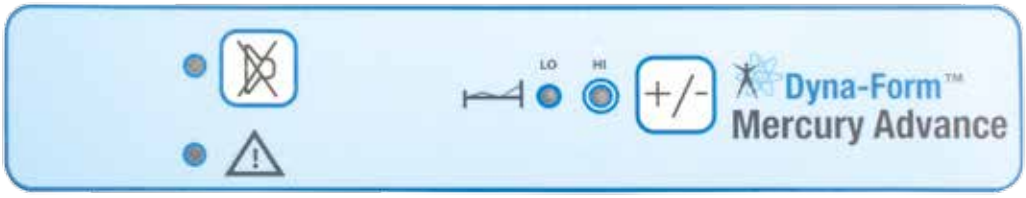
In Static Mode, the mattress attains the pressure reducing properties of the Dyna-Form Mercury static foam mattress (details available on request), whilst in Alternating Mode the mattress is able to offer similar properties to a pressure relieving dynamic system.

The digitally controlled Power Unit controls a pump that allows air to flow into, or out of the air cells as required according to the operating mode selected. It also maintains the air pressure within the mattress at the required level and controls the action of the audible/visual Audible Warning system in the event of mains supply failure or over or under inflation pressure. A CPR Valve located at the pump end of the umbilical hose permits the rapid deflation of the Mattress in an emergency.

2. Quick Reference Guide (Frequently used functions)

This is a quick reference guide for the **Dyna-Form Mercury Advance System**

Product Code MAT/MERADV/198/88/15



Power Switch Audible Warning Reset

The power switch simply switches the mains power to the pump on and off.

When the pump detects an Audible Warning condition, this can be silenced as below and re-set by switching the pump off and then back on again.

CPR Valve

Please ensure that the CPR connector is always placed fully home, prior to inflating the mattress.
NB: The mattress will NOT inflate properly should this not be the case.

The CPR connector is only to be used in the event of a clinical emergency for priority use.
However, disconnecting this function will cleverly deflate air rapidly from the mattress in readiness for transport / static mode.

LED Mode Settings

This symbol when illuminated (The blue indicator light) is not used to indicate that the equipment is on or ready for use.

When a patient requires a true dynamic function or indeed more pressure in the cells, as they may be uncomfortable or feel as though the support surface if too soft or unstable, then please select a “Hi” setting (pressure 26mmHg). This must only be used by a trained clinician as often too high pressures can further agitate certain patients conditions.

Power On / Off
True Dynamic /Firmer Setting

When a patient requires less pressure in the cells, as they may be uncomfortable or indeed hyper sensitive to cell movement or indeed if the patient is still reddening further, then please select a “Lo” setting. This must only be used by a trained clinician.

Lo I Comfort Pressure Setting

This function is used to silence the Audible Warning. The LED will remain lit if the Audible Warning has been silenced previously, however a fault is still detected. Refer to the power switch (as above) in order to re-set fully. If the Audible Warning continues to sound repeatedly, along with an illuminated light, then an engineer must be called.

Silence Audible Warning

This symbol indicates an “Audible Warning Failure”.
Please see trouble shooting guide below for how to re-set.

Audible Warning Failure

Note: Please ensure that all securing straps on the base of the mattress are secured onto the NON MOVING PARTS of the bed frame.

For shut down procedure, see 4.2 Power Unit (Pump) section.

3. Troubleshooting

Symptoms	Problems / Cause	Points to check
Low Pressure	The mattress is set to a mode that is too SOFT.	Change the mode button to standard (from Lo to High(+) a firmer pressure setting) as required. If the mattress is still too soft after a short period of 5 to 10 minutes, then please call an engineer.
	The CPR connector is not fully home.	Check all tubing is not kinked within the mattress.
	There may be a leak in the system.	Ensure that the tubing within the mattress is fully connected.
High Pressure	The mattress is excessively firm on a constant basis.	Set mattress to a softer setting as clinically required. Evaluate that the mattress is of a 'less firm' state after a short period of 5 to 10 minutes. If this is not achieved, then please follow the task as below before calling an engineer for assistance. Note: Check all tubing is not kinked within the mattress.

4. Installation

4.1. Mattress (This is the applied part type BF)

Place the Dyna-Form Mercury Advance Mattress directly on to the bed platform ensuring that the Blue multi-stretch waterproof cover is on top and that the umbilical hose is located at the left hand corner at the foot end of the bed. Note: The umbilical hose can be located inside the cover under the "Open Here for Air Inlet" printed in the bottom left hand corner of the mattress.

Cover the Mattress with a loose fitting sheet.

Static Mattress Use

The Dyna-Form Mercury Advance Mattress can be used as a pressure reducing mattress for patients at High Risk of pressure ulcer damage without the need to attach the pump.

Alternating Mattress Use

If / When required, the Dyna-Form Mercury Advance Mattress can be used as an alternating mattress system by attaching the Dyna-Form Mercury Advance pump system. **No other system should be attached to the mattress as the design settings and internal air pressure properties of the Dyna-Form Mercury Advance pump are specific to this mattress only.**

The Dyna-Form Mercury Advance is a replacement mattress system and should NOT be placed on top of any existing mattress.

The startup time from static to dynamic mode is immediate.

4.2. Power Unit (Pump)

Hang the Power Unit (Pump) onto the footboard. The mounting hooks swivel to suit the thickness of the footboard or rail. Connecting the Umbilical Hose to the Power Unit (Pump), place the 3-pin electrical plug into the wall outlet and switch on:

(a) Open the zip located at the bottom left hand side of the mattress and pull out the Blue Umbilical hose.

(b) Attach the Blue Umbilical Hose to the Power Unit (Pump) by connecting the air connector at the end of the Umbilical Hose to the air inlet connector at the bottom left hand side of the pump. Ensure that the Red CPR Release button is located on top of the Air Inlet connector after connection is complete.

(c) Re-close the zip as far as possible without clamping the Blue Umbilical Hose to ensure the mattress and air cells are sealed within the cover.

(d) Shut down is the reverse of items a, b & c above.

5. Operation

Attach the mains cable to the pump by inserting the “kettle” type connector into the recess located on the left hand side of the pump. The mains cable has been designed specifically as a removable part to aid in easy replacement should it become damaged in use.

The mains plug should be turned off and removed from wall socket as a means of isolation.

Plug the mains cable into a suitable 230v mains socket and switch on the Power Unit using the on/off switch.

After the pump has been turned on both the “Hi “and the “Lo” lights will flash together intermittently until the pump has attained its initial operating pressure. Once the pump has attained its initial operating pressure the “Lo” light will stay on constantly and the mattress is ready for use.

5.1. Lo / Hi Settings

The Dyna-Form Mercury Advance Mattress, in Alternating Mode, has two pressure settings. The initial setting that the pump will revert to upon set up is “Lo”. The “Lo” comfort setting is ideal for the lighter patient or those who feel discomfort when on a normal alternating air type mattresses system. However, for patients with existing pressure damage or those at Very High Risk, it is recommended that dependant on the clinical judgement of the clinician, the “Hi” setting is activated by pressing the +/- button once, which is located on top of the pump.

In “Hi” Mode the pump attains more of the characteristics of an alternating air mattress system whilst still utilising the advantages of the static foam inserts. Repeatedly pressing the ‘mode’ button enables the Lo & Hi modes to be selected in turn.

5.2. CPR Deflation

The CPR system consists of a manually operated button located on the Air Inlet connector attached to the pump. By pressing the Red Button, which will release the connector locking system, the user can remove the connector unit which will deflate the mattress air system back to that of a static foam mattress.

Note: After a short period as the Mattress deflates the ‘Low Pressure’ Audible Warning is activated and can be cancelled by switching the Power Unit off.

5.3. Troubleshooting

For assistance (if needed) in setting up, using or maintaining the Mercury Advance System, or to report unexpected operation or events, please contact Direct Healthcare Services on the contact details on the reverse of this manual.

6. Transportation

To change the location of the mattress, remove the Umbilical cord and allow the mattress to return to its Static Mattress form. Switch off the Power Unit (Pump) using the on/off switch and disconnect the electrical supply cable from the mains socket. The mattress can now be moved to a new location where it must immediately be reconnected to the mains electrical supply and the Power Unit (Pump) switched back on. Once the Mattress has been refilled, the ‘Alternating’ mode will automatically revert back to the Lo setting and should be reselected to Hi should this be desired by the clinician.

Warning: The Mattress will not ‘alternate’ when disconnected from the Power Unit (Pump) and /or the mains electrical.
Also refer to environmental conditions section at rear of this manual.

7. Audible Warnings

Audible Warning conditions are indicated by a flashing red display accompanied by an audible warning.
In each case the user should respond by turning the Power Unit’s switch off and investigating the cause.

7.1. High Pressure Audible Warning

This condition could be caused, for example by a kinked Umbilical Hose or visitors, and others, sitting suddenly on the Mattress.

7.2. Low Pressure Audible Warning

This condition could be caused, for example, by incorrect fitting of the air inlet connector, opening of the CPR Valve or a leak in the Mattress due to a cut or puncture.

7.3. Mains Failure Audible Warning

If mains power is lost the all Mode lights will turn off. This Audible Warning condition will only be audible. The red Audible Warning light will not flash.

8. Maintenance Procedures

8.1. Safety Warning

Only qualified technicians trained or formally approved by Direct Healthcare Services Ltd. in the operation and maintenance of Direct Healthcare Services products may carry out maintenance, modification or repair work on the equipment. Unqualified personnel attempting to work on Direct Healthcare Services Power Units risk serious injury to themselves and others and possibly death by electrocution. Inlet fuse NOT to be replaced by operator or patient, to be replaced by service personnel only.

Warning – Do not modify this equipment without authorisation of Direct Healthcare Services.

8.1.1 Servicing

Direct Healthcare Services (DHS) recommend that the Power Unit (Pump) should be serviced every year. The unit contains no user serviceable parts and should only be carried out by persons as described in section 8.1. DHS will make available on request service manuals, component parts lists and other information necessary for any suitably qualified person (As in 8.1) to carry out repair or service the system. For Service, maintenance and any questions regarding this please contact DHS.

8.2. Cleaning Procedures

Warning: Before cleaning the System make sure that the Power Unit (Pump) is disconnected from the mains electricity supply.

Do not immerse the Power Unit (Pump) in water or other fluids.

Do not autoclave, nor use phenol for cleaning.

Do wash hands before commencing the cleaning process.

Wear appropriate protective clothing such as gloves, apron and a mask.

Ensure all work surfaces are cleaned before and after contact with the Mattress.

8.3. Warning – Cleaning the Mattress

1. Cleaning should take place after use or between patients.
2. With cover left on the Mattress disconnect the Mattress from the Power Unit (Pump).
3. Clean the surface of the wash down table with Hypochlorite solution or equivalent disinfectant.
4. Wash Mattress top using hot water (60 degrees C) containing detergent – dry with a paper towel.
5. Use a Hypochlorite solution 1,000 parts per million available chlorine. For heavy contamination use a Hypochlorite solution 10,000 parts per million available chlorine. Please ensure thorough rinsing after cleaning.
6. Using suitable brush, hot water, detergent or Hypochlorite solution, clean Umbilical Hose and CPR Valve. Dry with paper towel.
7. If required, the Mattress Cover may be removed and machine-washed at a temperature of 80 degrees C, for not less than 10 minutes. The individual Air Cells can be wiped down with established disinfectants.
8. To avoid shrinkage of the cover line dry in an indoor clean environment or tumble dry on a low heat setting not exceeding 40 degrees C and not for longer than 10 minutes. Covers must be thoroughly dried before re-fitting to the mattress.

8.4. Warning – Cleaning the Power Unit (Pump)

The Power Unit can be cleaned by wiping with a cloth dampened with a detergent solution or Hypochlorite solution.
Also refer to symbol chart.

8.4.1 Warning

Ensure the Mercury Advance System is not exposed to:
1. Excessive heat sources e.g. fires, radiators etc
2. Water, particularly immersion of the pump.

9. Technical Data

9.1. Power Unit (Pump)

Serial Number	As per label on rear of pump
Electrical Supply.	220-240 volt, 50 Hz
Power Consumption	10 watts
Fuses	TA1H 250V
Protection against shock	Class 2
Noise Level	Approx. 30 dB (A)
Dimensions	235 x 180 x 80 mm
Weight	1.7 kg
Service Interval	12 months
Expected life	5 years
Shelf life of parts	5 years

9.2 Mattress

Serial Number	Label on inside of mattress cover
Number of Air Cells	14 Air Cells / 1 Static Foam Cell
Dimensions	1980 x 880 x 150mm (Nominal)
Weight	13.4kg
Expected life of Mattress	5 years
Shelf life of Mattress parts	5 years

10. Optimum Conditions

(Applies to Mattress and Pump)

10.1 Environment Conditions for Use

Transport	-25˚C – +70˚C
Storage	-25˚C – +70˚C
Usage	+5˚C – +40˚C
Humidity	10% – 93%
Atmospheric Pressure	700hPa – 1060hPa
Operational Altitude	≤ 2000m

10.2 Exposure

Exposure to direct sunlight, dust, lint and general debris is not considered to be an issue with the Mercury Advance System.

11. Symbols Guide

Mattress Symbols

WASH AT 80°

TUMBLE DRY ON LOW

DO NOT DRY CLEAN

REFER TO USER MANUAL

MEDICAL DEVICES DIRECTIVE 93/42EEC

TYPE BF APPLIED PART

DO NOT BLEACH

DO NOT IRON

NO SMOKING

MAXIMUM USER WEIGHT LIMIT 254 KG / 40 STONES

DO NOT USE SHARP INSTRUMENTS

DO NOT USE PHENOL

WARNING

THIS IS A STATEMENT THAT ALERTS THE USER TO THE POSSIBILITY OF SERIOUS INJURY OR OTHERWISE ADVERSE REACTIONS WITH THE USE OR MISUSE OF THE DEVICE

CAUTION

THIS IS A STATEMENT THAT ALERTS THE USER TO THE POSSIBILITY OF A PROBLEM WITH THE SYSTEM ASSOCIATED WITH ITS USE OR MISUSE

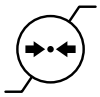
General Symbols

CAUTION

PROTECT FROM HEAT AND RADIOACTIVE SOURCES

TEMPERATURE LIMITATION

HUMIDITY LIMITATION


ATMOSPHERIC PRESSURE LIMITATION

Pump (Unit) Symbols

KEEP DRY

REFER TO USER MANUAL

DO NOT DISPOSE OF WITH HOUSEHOLD WASTE. PLEASE REFER TO DHS WEBSITE

DOUBLE INSULATED CLASS II

MEDICAL DEVICES DIRECTIVE 93/42EEC

Contraindications For Use (Warning)

The Mercury Advance System should not be used for patients with unstable fractures, gross oedema, burns, or intolerance to motion.

General Information (Caution) (Warning)

- There are no special skills required to operate the system.
- The Medical Professional is responsible for applying his/her best medical judgment when using the system.
- The electricity supply is of the type indicated on the Power Unit (pump).
- Check the mains lead is free from damage and is positioned so as not to cause an obstruction, or injury. E.g. Strangulation of a child or trip hazard.
- Ensure the mains lead cannot become trapped or crushed, e.g. by raising or lowering of the bed or bed rails or any other moving object.
- The power unit (pump) must only be used with a suitably approved power cord and plug set as supplied by DHS.
- The system is not to be used in the presence of flammable anaesthetics.
- Suitable for continuous use.
- Not suitable for sterilisation.
- Do not position the power unit to make it difficult to disconnect the power supply or plug.
- Do not place the System on or close to a source of heat.
- Do not use with hot water bottles or electric blankets.
- DHS strongly advise against smoking whilst the Power Unit (pump) is in use. This is to prevent accidental secondary ignition of items which may be flammable e.g. bed linen. The materials used in the manufacture of the Mercury Advance System comply with the required fire safety regulations.
- Do not use sharp objects on or near the mattress system as this will cause damage.
- Do not store in damp conditions.
- Do not use in an oxygen enriched environment.
- Not suitable for use in an Outdoor Environment.
- Intended for both Home Healthcare and Professional Healthcare environments.
- Do not connect to any other medical device or equipment.
- Correct fuse rating MUST be used. Failure to do so could result in the risk of a fire.
- The System should be cleaned after use or between patients. Refer to Cleaning section.
- All internal and external hoses must be free of twists, kinks. The external hose should also be properly connected and positioned so that the risk of obstruction or injury is eliminated.
- Do not use bleach, phenols. Chlorine based products which exceed 1000ppm. Solvents or alcohol based cleaners.
- All the above warnings and cautions together with safety considerations should be observed at ALL times during its use.
- Select correct setting ‘Hi’ or ‘Low’ as required. Care should be taken not to accidentally change settings once set. This may affect the desired requirement of the therapy. This could also be caused by pets, pests or children.

12. Detachable/Removable Parts

1. Mattress (Detached from the pump by removing the CPR connector). Part No. MAT/MERADV/198/88/15 (or variants of for the size)
2. Electric power cable. (Removed from the pump by pulling the cable away from the mains inlet on the side of the pump). Part No. DHS/ADV/MLEAD

N.B. The battery is an integral part of the Rotor PCB and is not removable or changeable.

Caution

Use of detachable parts not listed is not recommended by Direct Healthcare Services.

13. Disposal

Please refer to DHS website for recommendations and responsibilities for disposal within the UK WEEE guidelines.

EMI/EMC Statement and Manufacturer's Declaration

This equipment has been tested and found to comply with the limits of EN 60601-1-2 2007.

These limits are designed to provide reasonable protection against harmful interference in both a medical and residential environment. This equipment generates, uses and can radiate radio frequency energy and, if not used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception or other equipment, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment.
- Connect the equipment to an outlet on a circuit different from that to which the receiver or equipment was connected.

The equipment having been tested to operate within the limits of electromagnetic compatibility. (Immunity to interference from nearby sources radiating radio frequency energy). Sources exceeding these limits may give rise to operation faults. Where possible the system will sense the interference and if it is of short duration transparently take countermeasures whilst operating near normally, or failing this will issue a warning and take measures for the continued safely of the user. Further increased levels of energy may cause the system to stop operating, continuously generate random faults or continuous resets.

Try to ascertain the source of the interference by turning nearby or suspect equipment off, and see if the interference effects stop. In any such event the user is encouraged to try to correct the interference by one of the following measures:

- Have the interfering equipment repaired or replaced.
- Reorient or relocate the interfering equipment.
- Increase the separation between the equipment and the possible source of the interference.
- Connect the equipment to an outlet on a circuit different from that to which the interfering equipment was connected.

Information regarding Electro Magnetic Compatibility (EMC) according to IEC60601-1-2:2007, clause 6.8

With the increased number of electronic devices such as PC's and mobile telephones, medical devices in use may be susceptible to electromagnetic interference from other devices.
The EMC (Electro Magnetic Compatibility) standard IEC60601-1-2 defines the levels of immunity to these electromagnetic interferences. From the other hand, medical devices must not interfere with other devices. IEC60601-1-2 also defines the maximum levels of emissions for these medical devices.

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